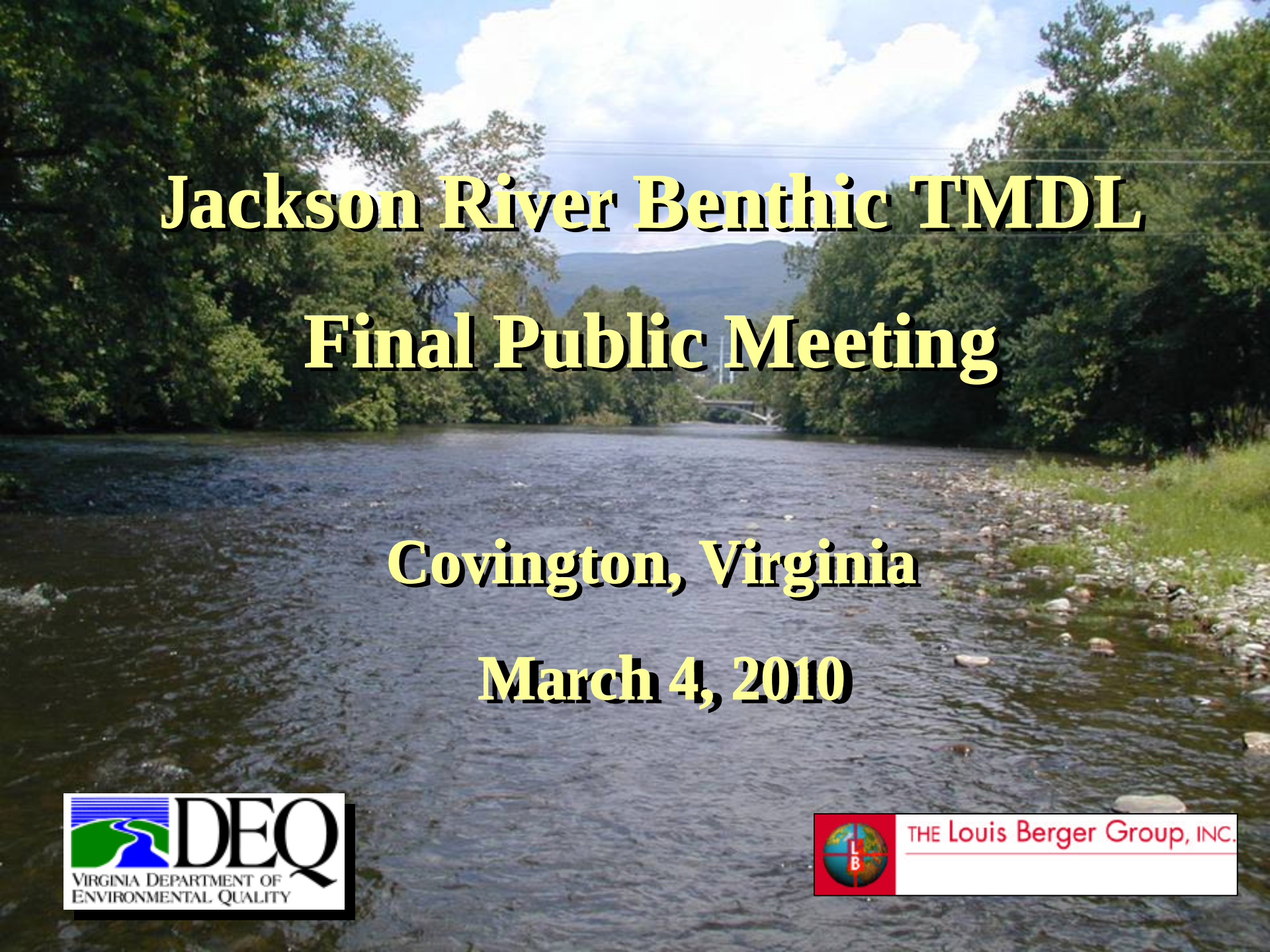


Jackson River Benthic TMDL

Final Public Meeting

Covington, Virginia

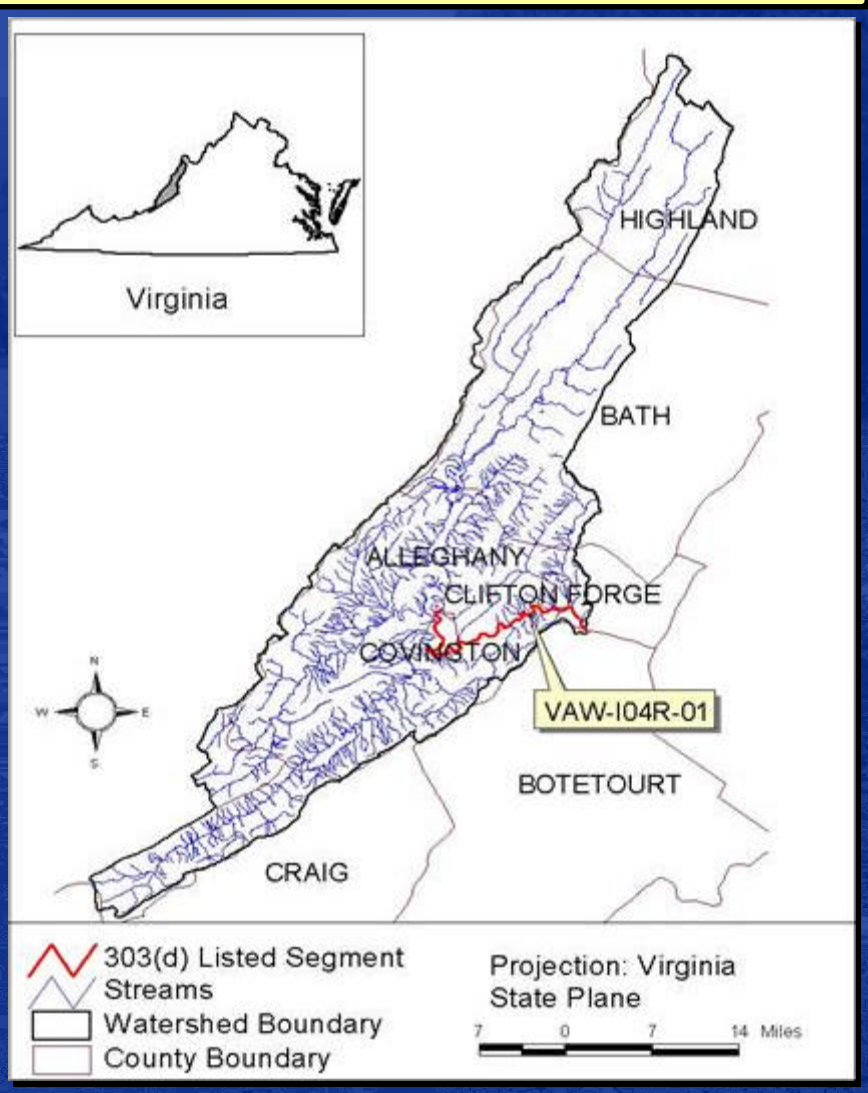
March 4, 2010

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

THE Louis Berger Group, INC.

Jackson River Listed Segment

- **Segment VAW-I04R-01**
  - Listed on the 1996, 1998, 2002, 2004 Section 303(d) Lists of Impaired Waters (VADEQ)
- **Upstream Limit:**
  - Immediately below the Covington City Water Treatment Plant intake
  - 24.21 River Mile
- **Downstream Limit**
  - Confluence of the Jackson and Cowpasture Rivers
  - 00.00 River Mile



Stressor Identification Summary

Non-Stressors
Temperature and pH
Metals and Organics
Sediments
Wet Weather
Possible Stressors
TDS-Toxicity
Low Dissolved Oxygen
Flow Modification
Most Probable Stressors
Nutrients / Periphyton

Stressor Identification Summary

- The common endpoint stressor is the excessive periphyton growth causing the benthic impairment
- This excessive periphyton growth is mainly caused by the excessive phosphorus in the river

TDP TMDL Endpoint

Proposed Nutrient TMDL Endpoints and Resulting N:P ratios		
PO_4-P TMDL end-point (mg/L)	Periphyton-Chla (mg/m^2)	TN:TP Ratio
0.038	100	11.7

TMDL end-point for a 100 mg/m^2 corresponds to a phosphorus-limited system.

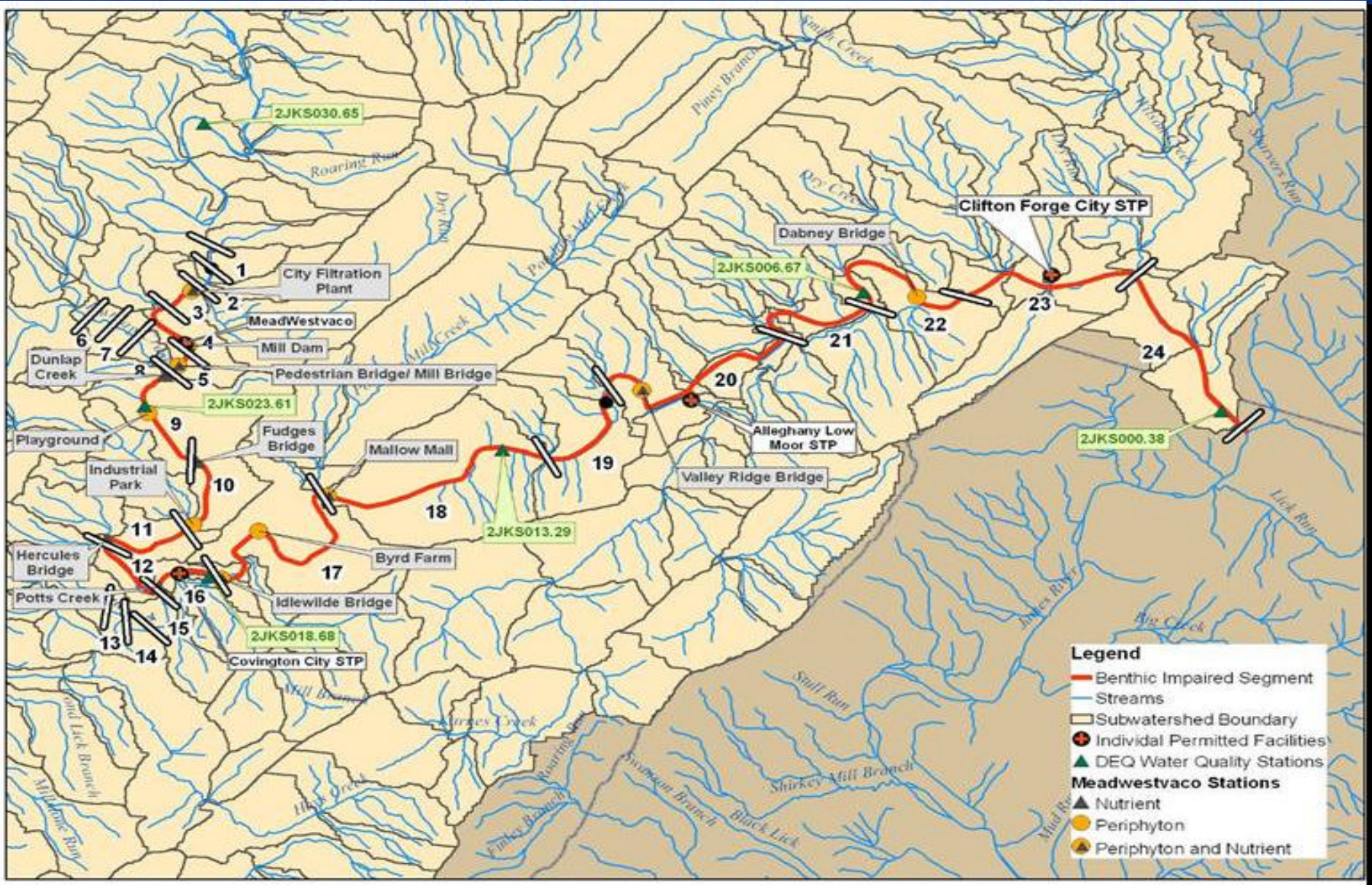
This ensures that the periphyton biomass will be reduced in the Jackson River.

Consequently, the initial endpoint for the Jackson River TMDL is 0.038 mg/L of PO4-P.

Modeling Strategy

- **Instream Model**
  - Water Analysis Simulation Program Version 7.2 (WASP7.2, July 2006)
- **Watershed Model**
  - Hydrologic Simulation FORTRAN (HSPF) to estimate nutrient NPS loads

Jackson River Model Segmentation

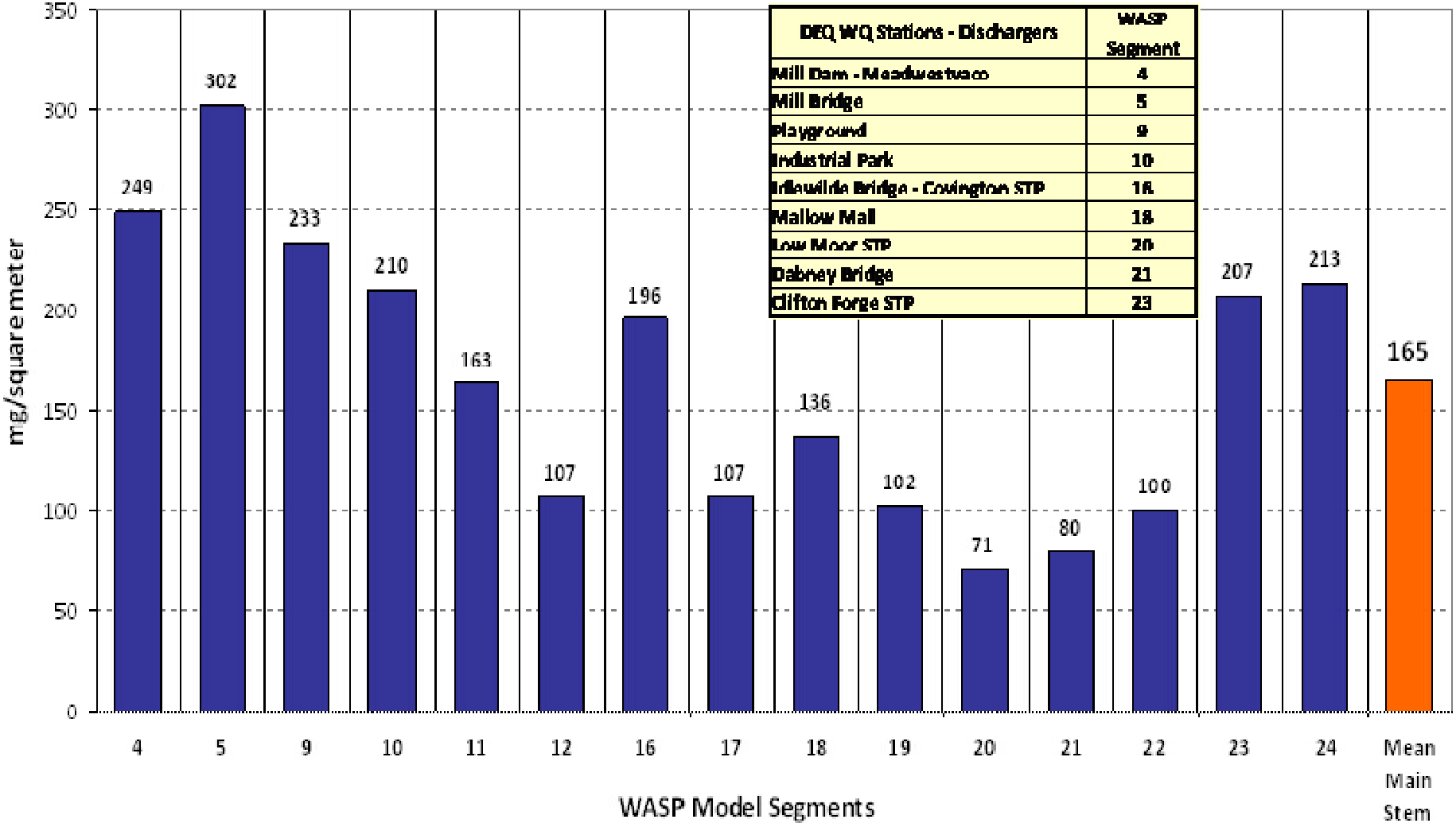


Modeling Scenarios

- Calibration Scenario (Growing Season 2001)
- Validation Scenario (Growing Season 2000)
- Existing Condition Scenario (Growing Season 2006)
- Chesapeake Bay Scenario (Growing Season 2006)
- Chesapeake Bay + Flow Pulsing (Growing Season 2006)

Periphyton Level Jackson River Main Stem Model Segments

2006 Existing Conditions Scenario - Growing Season (June - October)



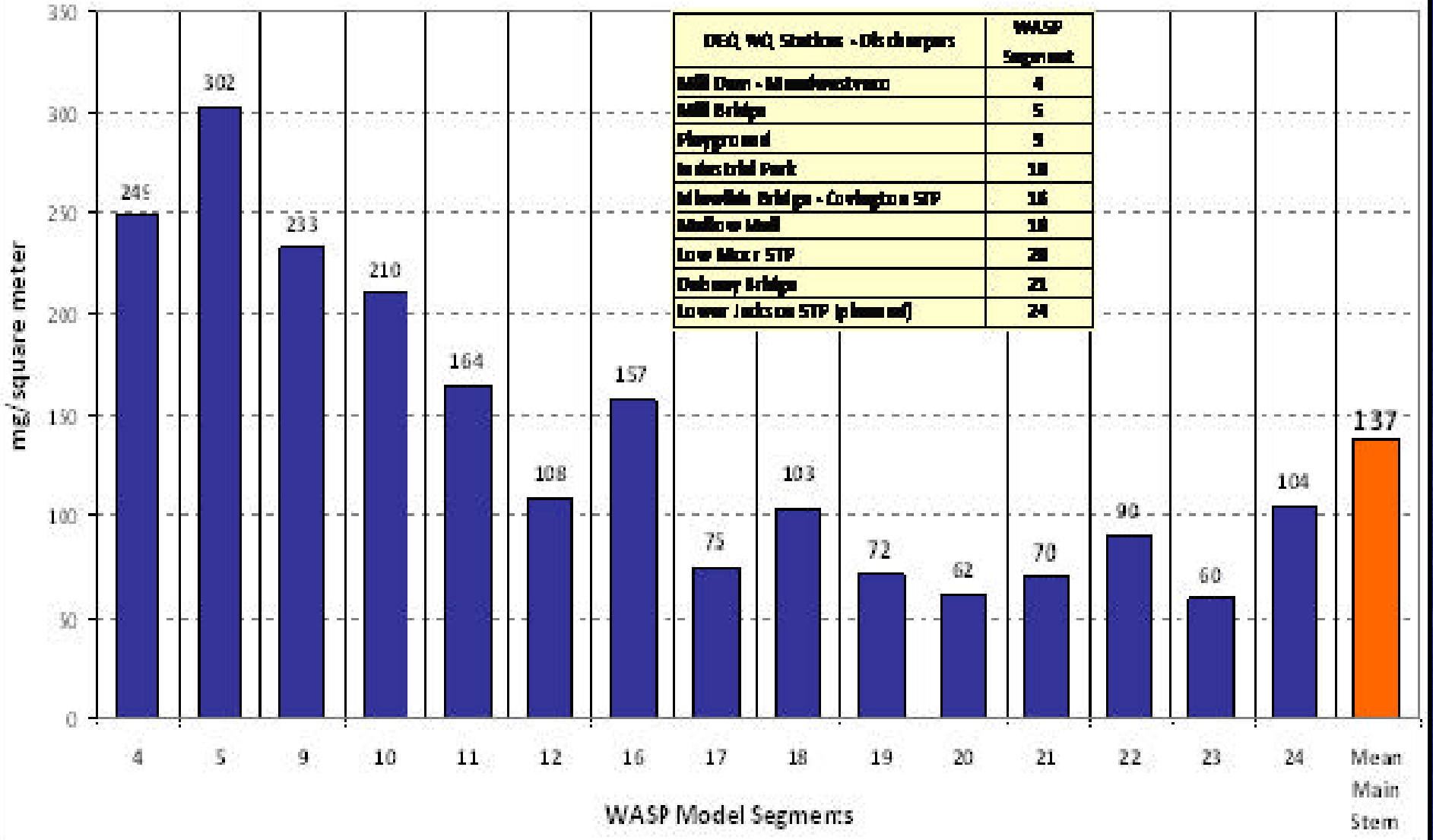
DEQ WQ Stations - Dischargers	WASP Segment
Mill Dam - Meadwestvaco	4
Mill Bridge	5
Playground	9
Industrial Park	10
Iriewilde Bridge - Covington STP	16
Mallow Mall	18
Low Moor STP	20
Dabney Bridge	21
Clifton Forge STP	23

Chesapeake Bay Recommended Nutrient Load Discharges

Facility Name	VPDES Permit	Discharge Flow (MGD)	TP Load (lbs/yr)	TP Conc. (mg/L)	TN Load (lbs/yr)	TN Conc. (mg/L)
MeadWestvaco	VA0003646	35.0	159,815	1.5	394,211	3.7
Covington STP	VA0025542	3.0	4,566	0.5	54,794	6.0
Low Moor WWTP	VA0027979	0.3	1,050	1.15	5,479	6.0
Lower Jackson River WWTP	VA0090671	2.6	3,957	0.5	47,488	6.0

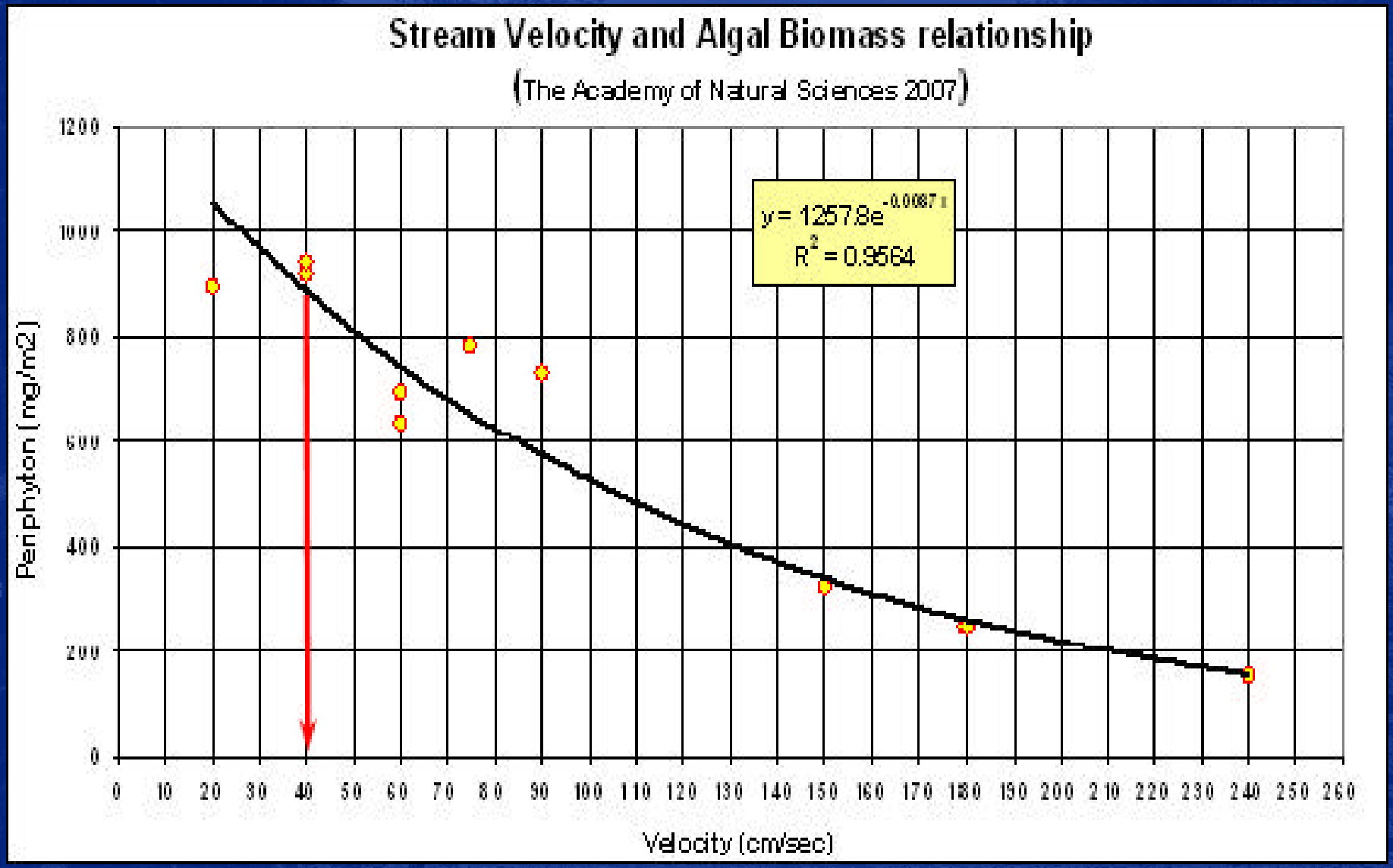
Periphyton Level Jackson River Main Stem Model Segments

Chesapeake Bay Scenario - Growing Season (June - October)

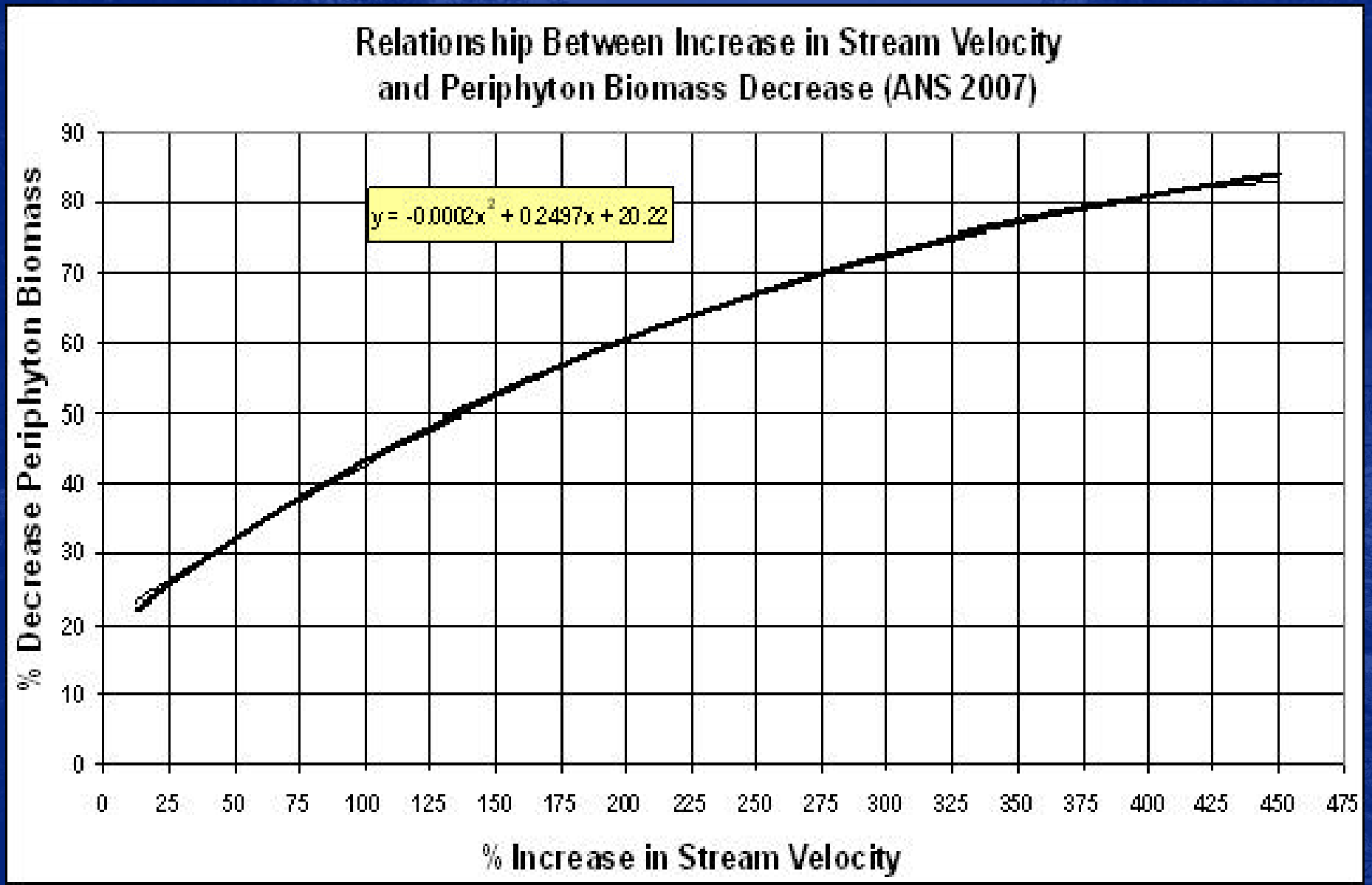


DEQ WQ Stations - Discharges	WASP Segment
Mill Dam - Monelison Fresco	4
Mill Bridge	5
Playground	9
Industrial Park	10
Millenville Bridge - Covington STP	11
Mallow Mall	12
Low Moor STP	16
Dabney Bridge	21
Lower Jackson STP (planned)	24

ANS Relationship

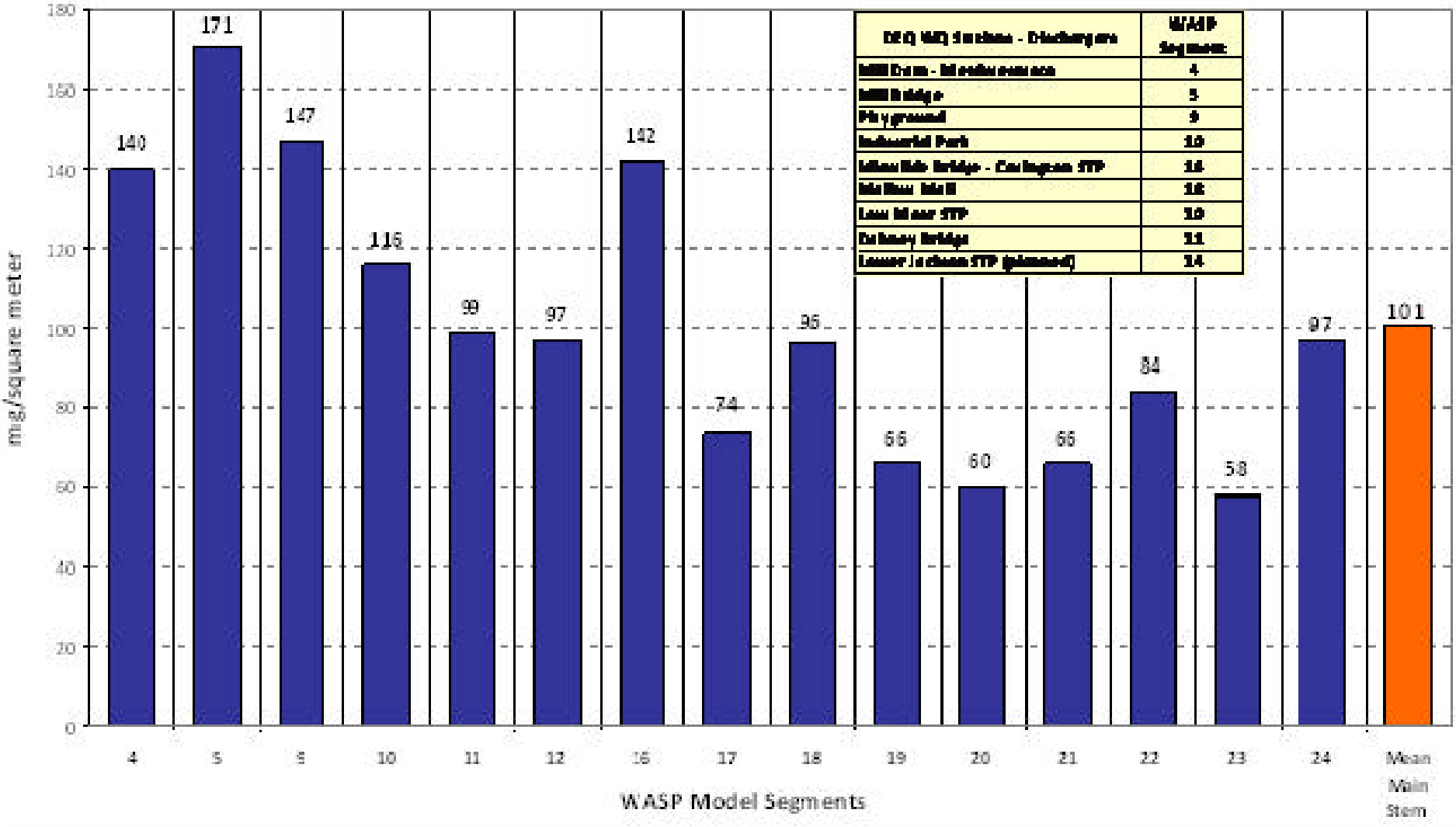


Dimensionless ANS Relationship



Periphyton Level Jackson River Main Stem Model Segments

Chesapeake Bay Scenario + Flow Pulsing - Growing Season (June - October)



DEQ WQ Stations - Discharges	WASP Segment
[illegible]	4
[illegible]	5
Playground	9
[illegible] Park	10
[illegible] Bridge - Covington STP	16
[illegible] Mill	16
[illegible] STP	16
[illegible] Bridge	11
[illegible] STP (planned)	14

Jackson River Total Phosphorus Waste Load Allocations

Facility Name	VPDES Permit	Discharge Flow (MGD)	TP Conc. (mg/L)	TP Load Allocation (lbs/Growing Season)
MeadWestvaco	VA0003646	35	1.5	66,991
Covington STP	VA0025542	3	0.5	1,914
Low Moor WWTP	VA0027979	0.3	1.15	440
Lower Jackson River WWTP	VA0090671	2.6	0.5	1,659
			Total	71,004

Jackson River PO_4-P and Organic P Waste Load Allocations

Facility Name	VPDES Permit	PO_4-P Conc. (mg/L)	PO_4-P Load Allocation (lbs/Growing Season)	Org P Conc. (mg/L)	Organic P Load Allocation (lbs/Growing Season)
MeadWestvaco	VA0003646	0.21	9,379	1.290	57,612
Covington STP	VA0025542	0.335	1,282	0.165	632
Low Moor WWTP	VA0027979	0.7705	295	0.380	145
Lower Jackson River WWTP	VA0090671	0.335	1,111	0.165	547
		Total	12,068	-	58,936

Jackson River Total Nitrogen Waste Load Allocations

Facility Name	VPDES Permit	Discharge Flow (MGD)	TN Conc. (mg/L)	TP Load Allocation (lbs/Growing Season)
MeadWestvaco	VA0003646	35	3.7	165,245
Covington STP	VA0025542	3	6	22,968
Low Moor WWTP	VA0027979	0.3	14	5,359
Lower Jackson River WWTP	VA0090671	2.6	6	19,906
			Total	213,478

Jackson River NH_3, NO_3, and Organic N Waste Load Allocations

Facility Name	NH_3-N Conc. (mg/L)	NH_3-N Load Allocation (lbs/Growing Season)	NO_3-N Conc. (mg/L)	NO_3-N Load Allocation (lbs/Growing Season)	Organic-N Conc. (mg/L)	Organic-N Load Allocation (lbs/Growing Season)
MeadWestvaco	0.83	37,068	0.1	4,466	2.8	123,710
Covington STP	0.42	1,608	4.8	18,375	0.8	2,986
Low Moor WWTP	0.98	375	11.2	4,287	1.8	697
Lower Jackson River WWTP	0.42	1,393	4.8	15,925	0.8	2,588
Totals		40,445		43,053		129,981

TMDL Equations

Jackson River Total Phosphorus TMDL (lbs / Growing Season)			
WLA (Point Sources)	LA (Non-point sources)	MOS (Margin of Safety)	TMDL
71,004	2,880	Implicit	73,884

Jackson River Total Nitrogen TMDL (lbs / Growing Season)			
WLA (Point Sources)	LA (Non-point sources)	MOS (Margin of Safety)	TMDL
213,478	24,160	Implicit	237,638

Local TMDL Contacts

Department of Environmental Quality

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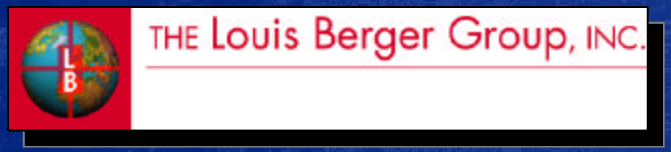
www.deq.virginia.gov

Reports/presentations available at:

www.deq.virginia.gov/tmdl/mtgppt.html



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